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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/660,052	09/12/2000	Hideki Tengeiji	KYO.P0002	5834

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EXAMINER
HANNETT, JAMES M

ART UNIT	PAPER NUMBER
2612	6

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DATE MAILED: 04/06/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/660,052	TENGEIJI ET AL.	
	Examiner	Art Unit	
	James M Hannett	2612	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☑ Responsive to communication(s) filed on 9/12/00

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-5 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-5 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on 12 September 2000 is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☒ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date 3.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Specification

The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

The following title is suggested: Solid-state imaging device with a pixel-shifting function.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

1: Claims 1-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over USPN 6, 018,363 Horii in view USPN 6,577,341 Yamada et al.

2: As for Claim 1, Horii teaches in Figure 8 and on Column 13, Lines 21-45 and Column 14, Lines 8-32 an image sensing apparatus comprising: A solid-state image sensing device (106) to convert light from an object into an image signal; Horii teaches that different exposures are performed for the different pixel shifts. Therefore, it is inherent that the camera include a shutter provided between the object and the solid-state image sensing device, to expose the solid-state image sensing device to the light for a first exposure period and a second exposure period that directly follows the first exposure period. The first and second exposures are viewed by the examiner as the exposures that are performed for each pixel shift operation. Horii teaches on Column 14, lines 15-32 a processor to combine image signals converted for the first and the second exposure periods to generate a composite image signal. Horii teaches on Column 13,

Lines 28-38 a shift mechanism (104), to shift a passage of the light incident to the solid-state image sensing device (106) in a predetermined direction with respect to the solid-state image sensing device at least in the second exposure period.

Horii teaches the use of performing multiple exposures when the parallel plate has been rotated to four different positions. However, Horii does not teach that the different exposure are of the same exposure time.

Yamada teaches on Column 2, Lines 31-46 and Column 5, Lines 16-20 that it is advantageous when combining multiple exposures that are performed by shifting an image plane to set the exposure time for all the exposures equal to each other. Yamada teaches that this method is advantageous because it improves the ability of the camera to create a composite image.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to set the exposure time for the different exposures in Horii equal to each other as taught by Yamada in order to improve the ability of the camera to create a composite image.

Horii in view of Yamada does not teach that the shutter is placed before the parallel-sided plate. Horii teaches in Figure 3, (a different embodiment) the use of including a shutter mechanism (3) directly after a diaphragm. However, is silent as to the location of the shutter apparatus when image shifting is performed by the parallel-sided plate.

Official notice is taken that it was well known in the art at the time the invention was made to place a shutter mechanism directly after the diaphragm in the invention of Horii in order to reduce the construction complexity of a camera.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to place a shutter mechanism directly after the diaphragm in the invention of Horii in order to reduce the construction complexity of a camera and because it was common practice in the art at the time the invention was made to do so.

3: In regards to Claim 2, Horii teaches on Column 14, Lines 15-17 wherein the shift mechanism shifts the passage of light for a period from a moment in the first exposure period to another moment in the second exposure period.

4: As for Claim 3, Yamada further teaches on Column 8, Lines 48-62 that it is advantageous to include in the optical system an optical low-pass filter to damp the spatial frequency component which causes the color Moire from the picture image light to eliminate the color Moire.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to include in the optical system an optical low-pass filter in the optical system of Horii as taught by Yamada to damp the spatial frequency component which causes the color Moire from the picture image light to eliminate the color Moire.

5: In regards to Claim 4, Horii teaches in Figure 8 and on Column 13, Lines 21-45 and Column 14, Lines 8-32 an image sensing apparatus comprising: A solid-state image sensing device (106) to convert light from an object into an image signal; Horii teaches that different exposures are performed for the different pixel shifts. Therefore, it is inherent that the camera include a shutter provided between the object and the solid-state image sensing device, to expose the solid-state image sensing device to the light for a first exposure period and a second exposure period that directly follows the first exposure period. The first and second exposures are viewed

by the examiner as the exposures that are performed for each pixel shift operation. Horii teaches on Column 14, lines 15-32 a processor to combine image signals converted for the first and the second exposure periods to generate a composite image signal. Horii teaches on Column 13, Lines 28-38 a shift mechanism (104), to shift a passage of the light incident to the solid-state image sensing device (106) in a predetermined direction with respect to the solid-state image sensing device at least in the second exposure period.

Horii teaches the use of performing multiple exposures when the parallel plate has been rotated to four different positions. However, Horii does not teach that the different exposure are of the same exposure time.

Yamada teaches on Column 2, Lines 31-46 and Column 5, Lines 16-20 that it is advantageous when combining multiple exposures that are performed by shifting an image plane to set the exposure time for all the exposures equal to each other. Yamada teaches that this method is advantageous because it improves the ability of the camera to create a composite image.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to set the exposure time for the different exposures in Horii equal to each other as taught by Yamada in order to improve the ability of the camera to create a composite image.

6: As for Claim 5, Horii teaches on Column 14, Lines 15-17 wherein the shift mechanism shifts the passage of light for a period from a moment in the first exposure period to another moment in the second exposure period.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. USON 6,195,125 Udagawa et al teaches the use of a pixel shifting image sensor that uses low pass filters; US 2002/0126209 Yamada et al teaches the use of a camera that utilizes image shifting to increase the resolution of images; USPN 6,108,036 Harada et al teaches the use of an imaging apparatus having an image shifting mechanism to increase the resolution of images; USPN 6,650,361 Shiomi teaches the use of a camera with an image shifting mechanism; USPN 6,678,000 Sakata teaches the use of a high resolution image capture device that shifts pixels to improve image quality.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to James M Hannett whose telephone number is 703-305-7880. The examiner can normally be reached on 8:00 am to 5:00 pm M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wendy Garber can be reached on 703-305-4929. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

James M. Hannett
Examiner
Art Unit 2612

JMH
March 22, 2004

NGOC-YEN VU
PRIMARY EXAMINER